

1 an annular main channel with generally cylindrical or conical walls for receiving said generally
2 circular flow of said first polymer material and conducting the same to an annular exit orifice to exit
3 there from as a tubular film structure,

4 said exit section also comprising a channel system spaced radially from said main channel
5 for extrusion from the circumference of said exit section of a circular array of narrow strands of a
6 second molten polymer material,

7 said channel system ending in a circular row of internal orifices opening into a circular wall
8 portion of the main channel upstream of said exit orifice so that said circular array of said second
9 polymer material merges with the circular flow of said first polymer material as circumferentially
10 spaced strands superimposed on said circular flow.

1 38.(withdrawn) A circular extrusion die according to claim 37 wherein said channel system
2 for said circumferential extrusion begins at at least one inlet in said exit section and comprises

3 for delivering said second polymer material to each said internal orifice a labyrinthine sub-
4 channel system communicating at one end with such inlet and at the other end with the respective
5 internal orifice,

6 said sub-channel system comprising at least three channel-branchings between said ends to
7 promote a balanced division of polymer flow to said internal orifices.

39.(canceled)

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57.(canceled)

~~strands in the respective arrays are in contact with one another at their crossing points and are of a polymer material such as to be directly laminated to each other at said crossing points.~~

78.(currently amended) The A cross-laminate according to claim 76119, wherein:

The polymer material of the strands of at least one of said arrays discontinuous layer of at least one of the films A and B comprises coloration material in an sufficient amount, a coloration, or an amount and coloration sufficient to render the strands at least one colored discontinuous layer visible through at least one side of the cross-laminate.

79.(currently amended) The A cross-laminate according to claim 76118, wherein:

the a thickness of the discontinuous layers strands in the first surface layer of each of said the films A and B is are not greater than 20% of the a thickness of their respective films.

80.(currently amended) The A cross-laminate according to claim 76118, wherein:

~~the a collective area of the discontinuous layers of the films A and B comprises strands in~~
~~each of said first surface layers constitutes not no more than 60% of the a surface area of the their~~
~~respective film sides.~~

81.(currently amended) The A cross-laminate according to claim 76118, wherein the a thickness increase in each of said the films A and B at the locations where the strands discontinuous layers are present is at most 20% of the a film thickness in adjacent strand-free regions thereof where the discontinuous layer are absent.

82.(currently amended) The ~~A~~ cross-laminate according to claim ~~7677~~, wherein the a distance from ~~the~~ a center-to-center of adjacent pairs of strands in each array is between 2 mm and 40 mm.

83.(currently amended) The A cross-laminate according to claim 76119, wherein:

~~the lamination a strength at said crossing points of the thin strands of said arrays is of the~~
strong bonds are at least 40 g cm⁻¹, as measured by a peel test carried out on narrow specimens of
the cross-laminate at a velocity of about 1 mm sec⁻¹, and
~~and the lamination a strength in the strand-free regions is of the weak bonds are less than or~~

1 ~~equal to at the highest 75% of the bonding strength of the strong bonds between the strands at said~~
2 ~~the crossing points, as measured by said the peel test.~~

1 84.(canceled)

1 85.(currently amended) The A cross-laminate according to claim 7684, which comprises
2 wherein:

3 ~~on at least one of its outer films, a coextruded an exterior layer formed on an exterior surface~~
4 ~~of at least the film B or the second B film layer of comprising a polymer material adapted to enhance~~
5 ~~a surface property of the laminate, where the property is selected from the group consisting of its~~
6 ~~heat-sealing capability or and its frictional properties property.~~

1 86.(currently amended) The A cross-laminate according to claim 76118, wherein:
2 the main layer of each of said the two films A and B consists essentially of polyethylene or
3 polypropylene.

1 87.(currently amended) The A cross-laminate according to claim 76119, wherein:
2 ~~in each of said films A and B:~~
3 the main layers is are selected from the group consisting of HDPE, LLDPE or a blend of the
4 two,
5 ~~the continuous second surface bonding layers is formed mainly of comprise LLDPE in~~
6 ~~admixture with 5 - 25% of a copolymer of ethylene having a melting point or a melting range within~~
7 ~~the temperature range of 50 - 80°C, and~~
8 ~~the strands in the first surface layers of said the films is discontinuous layers comprise~~
9 ~~selected from a polymer which consists consisting essentially of a copolymer of ethylene having a~~
10 ~~melting point or a melting range within the temperature range of 50 - 100°C or a blend of such~~
11 ~~copolymer and LLDPE containing at least 25% of the said the copolymer.~~

1 88.(currently amended) The A cross-laminate according to claim 7787, wherein:
2 said the bonding second surface layers includes an adhesion modifying material to establish
3 a blocking between the contacting mutually facing strand-free regions thereof to aid in adhesion of
4 the weak bonds.

1 89.(currently amended) The A cross-laminate according to claim 7677, wherein:
2 the pattern of the discontinuous layer the first surface layer on at least one of said the films
3 A and B comprises at least two of said arrays of strands,
4 at least one of said the two arrays of strands being formed of a polymer material differing
5 in appearance from the another of said the two arrays of strands and
6 where the strands of the differing two arrays being are interspersed with one another.

1 90.(currently amended) The A cross-laminate according to claim 76118, wherein:
2 said first surface layer on the discontinuous layers of each of the films A and B constitutes
3 at their highest 10% of the volume a height of their corresponding film.

1 91.(currently amended) The A cross-laminate according to claim 76118, wherein:
2 the an average melting point of the polymer material which constitutes of the strand-formed
3 first layer discontinuous layer of each of said the films A and B is at least about 10°C lower than the
4 an average melting point of the polymer material of the the main layer of each of the films A and
5 B.

1 92.(currently amended) The A cross-laminate according to claim 76118, wherein:
2 the an average melting point of the polymer material which constitutes of the strand-formed
3 first layer discontinuous layer of each of said the films A and B is at least about 15°C lower than the
4 an average melting point of the polymer material of the the main layer of each of the films A and
5 B.

1 93.(currently amended) The A cross-laminate according to claim 76118, which further
2 comprises comprising:
3 a continuous extrusion lamination bonding layer introduced between said films A and B to
4 laminate said films in said sandwich relation interposed between the main layer and the
5 discontinuous layer of at least one of the films A and B.

1 94.(currently amended) The A cross-laminate according to claim 76118, wherein:
2 the a thickness of the strands in said first surface layer discontinuous layers of each of said

1 the films A and B is are not greater than 10% of the a thickness of their respective film.

1 95.(currently amended) The A cross-laminate according to claim 76118, wherein
2 the a thickness increase of each of said the films A and B at the locations where the strands
3 are discontinuous layer is present is at most 10% of the a film thickness in strand-free regions of the
4 films free of the discontinuous layer.

1 96.(currently amended) The A cross-laminate according to claim 76119, wherein:
2 the lamination a strength of the weak bonds is no in said strand-free regions of said cross-
3 laminate is not more than 50% of the lamination a strength of the strong bonds at said crossing
4 points of the strands thereof, as measured by a peel test carried out on narrow specimens of the
5 cross-laminate at a velocity of about 1 mm sec⁻¹.

1 97.(currently amended) The A cross-laminate according to claim 7678, wherein the cross-
2 laminate has having a thickness at the highest its thickest of about 0.3 mm, and:
3 wherein a said film A is situated at one of its sides;
4 said film A having its an exterior surface of the film A is corrugated to form a visible pattern
5 of striations extending in one direction,
6 with the where a spacing of said the striations in said pattern being at most about 3 mm,
7 the main layer and said second surface the bonding layer of said the film A are substantially
8 transparent to enable the coloured colored strands to be visible when the laminate is observed from
9 an A-side one of the exterior surfaces of the cross-laminate, and
10 the a depth of the corrugations is sufficient to impart a three-dimensional effect to said the
11 cross-laminate such that the strands appear to be spaced internally from the exterior surface of said
12 the film A a distance substantially greater than the an actual maximum thickness of said the film A.

1 98.(currently amended) The A cross-laminate according to claim 76118, wherein:
2 said first surface layer on the discontinuous layers of each of the films A and B constitutes
3 at their highest 5% of the volume a height of their corresponding film

1 99.(currently amended) The A cross-laminate according to claim 76118, wherein:
2 the average melting point of the polymer material which constitutes the strand-formed first

1 a main layer of a polymer material selected to give high tensile strength and
2 a continuous surface layer of a different polymer material on the side thereof facing
3 said at least one of said films A and B,
4 the polymer material of said continuous surface layer being adapted when the films
5 are is laminated to produce a higher lamination strength of said film C with said
6 opposite side of said at least one of films A and B than the lamination strength
7 between films A and B in the strand-free regions thereof.

1 108.(withdrawn) A method according to claim 101 wherein:

2 the separate coextrusions of said films A and B are so controlled that the relative rates of
3 extrusion flow of the polymeric materials of said main, second and first surface layers of said films
4 A and B are such that said first surface layer on each of the films A and B constitutes at the highest
5 10% of the volume of the respective film A or B.

1 109.(withdrawn) A method according to claim 101 wherein:

2 the average melting point of the polymer material of said strand-formed first surface layer
3 of each of said films A and B is at least about 10°C lower than the average melting point of the
4 polymer material of the main layer thereof.

1 110.(withdrawn) The method according to claim 101 wherein the polymer material of the
2 strand-formed array of at least one of said films A and B comprises coloration material in sufficient
3 amount and/or coloration to render the strands visible through at least one side of the cross-laminate.

1 111.(withdrawn) A method according to claim 101 wherein:

2 the polymer materials of said main layer and said second continuous layer of said film A are
3 sufficiently transparent to render the strands of said first surface layer thereof visible therethrough,
4 and

5 coextrusion conditions for the respective films are controlled so that the general thickness
6 of the final laminate is not more than about 0.3 mm, which further comprises:

7 embossing at least the exterior surface of said film A into corrugations forming a pattern of
8 striations extending in one direction with corresponding thickness variations in said film,

9 the separation between the striations in said pattern being not more than about 3 mm and

1 the depth of the corrugations being sufficient to impart a three-dimensional effect to the
2 cross-laminate such that the strands when viewed from the A-side appear to be spaced internally
3 from the exterior surface of said film a distance substantially greater than the actual maximum
4 thickness of said film A.

1 112.(withdrawn) A method according to claim 111 wherein: said embossing is carried out by:
2 passing said films A and B after they have been brought together in sandwich relation and:
3 before or after said films have been laminated through at least one pair of mutually
4 intermeshing grooved rollers to form said corrugations while simultaneously effecting a transverse
5 stretching of the same.

1 113.(withdrawn) A method according to claim 101 wherein:
2 the separate coextrusions of said films A and B are so controlled that the relative rates of
3 extrusion flow of the polymeric materials of said main, second and first surface layers of said films
4 A and B are such that said first surface layer on each of the films A and B constitutes at the highest
5 5% of the volume of the respective film A or B.

1 114.(withdrawn) A method according to claim 101 wherein;
2 the average melting point of the polymer material of said stand-formed first layer of each of
3 said films A and B is at least about 20°C lower than the average melting point of the polymer
4 material of the main layer thereof.

1 115.(withdrawn) A method according to claim 102 wherein:
2 said first surface layer of said tubular film is coextruded discontinuously so that the distance
3 from center-to-center of adjacent strands thereof is at most 20 mm.

1 116.(withdrawn) A method according to claim 101 wherein: said laminating comprises:
2 extruding between said films A and B an intermediate layer of a molten polymer material
3 selected to effect lamination of the films as they are brought together in sandwich relation and
4 cooled.

1 117.(withdrawn) A method according to claim 101 which further comprises

1 coextruding at least one of said films A and B with a said discontinuous surface layer on both
2 of its sides,

3 separately coextruding a film C having a said main layer with a said first discontinuous
4 surface layer and a said second continuous surface layer on at least one of its sides and

5 laminating said film C to an exterior side of at least one of said films A and B with the first
6 surface layer of film C facing said exterior side before, during or after films A and B are brought
7 together in said sandwich relation to laminate the said films A, B and C together,

8 the polymer material of the surface layer of said film C being selected in association with
9 the lamination conditions to produce a stronger lamination at the crossing points of the strands of
10 its first surface layer and the strands of the adjacent first surface layer of said film A or B than in the
11 strand-free regions thereof.

1 118.(new) A cross-laminate comprising:

2 a first coextruded film A having a main direction of molecular orientation and including:

3 a continuous main layer comprising a polymer material having a high tensile
4 strength,

5 a patterned discontinuous layer disposed on a surface of the main layer, where the
6 discontinuous layer comprises a different polymer material,

7 a second coextruded film B having a main direction of molecular orientation and including:

8 a continuous main layer comprising a polymer material having a high tensile strength,

9 a patterned discontinuous surface layer disposed on a surface of the main layer,
10 where the discontinuous layer comprises a different polymer material,

11 where the film B is arranged so that the main direction of the film B crosses the main

12 direction of the film A and the pattern of the discontinuous layer of the film B

13 crosses the pattern of the discontinuous layer of the film A, and

14 strong bonds bonding the films together at intersections of the pattern of the discontinuous
15 layer of the film A and the pattern of the discontinuous layer of the film B,

16 where the films A and B are either uniaxially or unbalanced biaxially molecularly oriented.

1 119.(new) The cross-laminate according to claim 118, further comprising:

2 a continuous bonding layer interposed between the main layer and the discontinuous layer
3 of each of the films A and B and

1 weak bonds formed between the bonding layers of the films A and B in regions of the films
2 free of the discontinuous layers.

1 120.(new) The cross-laminate according to claim 118, further comprising:
2 moderate bonds formed between the bonding layer of one the films A or B and the
3 discontinuous layer of the other film B or A.

1 121.(new) A cross-laminate according to claim 118, wherein:
2 the film A further including a patterned second discontinuous layer disposed on a second
3 surface of the main layer, where the second discontinuous layer comprises a different polymer
4 material, and
5 the cross-laminate further comprising:
6 a second B film arranged so the main direction of the second B film crosses the main
7 direction of the film A and the pattern of the discontinuous layer of the second B film
8 crosses the pattern of the second discontinuous layer of the film A,
9 second strong bonds bonding the second B film to the film A together at intersections of the
10 pattern of the second discontinuous layer of the film A and the pattern of the discontinuous layer of
11 the second B film ,
12 where the second B film is either uniaxially or unbalanced biaxially molecularly oriented.

1 122.(new) The cross-laminate according to claim 120, further comprising:
2 a continuous bonding layer interposed between the main layer and the discontinuous layer
3 of each of the film A, the B film and the second B film and
4 weak bonds formed between the bonding layers of the films A and B and the films A and the
5 second B film in regions of the films free of the discontinuous layers.